FNIRSi 菲尼瑞斯

DSO-TC4

多功能晶体管示波器 V1.6

MULTIFUNCTION TRANSISTOR OSCILLOSCOPE USER MANUAL

※使用产品前请仔细阅读本说明书，并妥善保管。

※Please read this instruction manual carefully before using the product and keep it properly.

CONTENTS

1. SAFETY REQUIREMENTS

1.1 Environmental Requirements

Precautions

- Avoid high temperatures, open flames, corrosive gases, humid or dusty environments to prevent equipment failure.
- When installing transistors on equipment, pay attention to whether the transistor socket is in good condition to avoid poor contact.
- If you measure directly without discharging the capacitor, the machine will discharge the capacitor and produce sparks at the moment of insertion and locking. This function only serves as a protection when you forget to discharge. If used correctly, it is recommended to manually discharge the capacitor before testing.
- During non-measurement, the 123 locking interface is in the on state, and direct insertion of the battery is prohibited.
- If the measured component parameters are not within the test range, the test results may show incorrect component types.

Keep away from the following items

- Heaters: Avoid overheating or fire risks.
- Water, chemicals: Solvents: Leakage may damage the device or cause a fire.
- Strong magnetic devices: Prevent magnetic fields from interfering with the normal operation of the device.

Do not discard used batteries or devices with household waste. Dispose of in accordance with national or local regulations.

2.PRODUCT OVERVIEW

2.1 Product Introduction

DSO-TC4 is a multifunctional transistor oscilloscope launched by FNIRSI, which is comprehensive and practical, and is designed for the maintenance and R&D industries. It integrates an oscilloscope, a signal generator, and a transistor.

The main features of the product are:

Oscilloscope functions:

- Sampling rate: 48MSa/s
- Analog bandwidth: 10MHz
- Voltage protection: ±400V
- Waveform storage: supports screenshot saving and viewing, which is convenient for data analysis

Signal generator function:

• Supports 13 waveform outputs, frequency range 0-50KHz, output voltage adjustable 0-3v.

• Output parameters (frequency, amplitude, duty cycle) are adjustable, flexible to meet various needs

Transistor function:

• High efficiency: Automatically identify the type and pin arrangement of the tested component, simplify the operation process, and improve test efficiency

• Diverse categories: Detect and analyze the performance and characteristics of semiconductor components such as transistors, diodes, triodes, field effect (FET), etc.

Portable design:

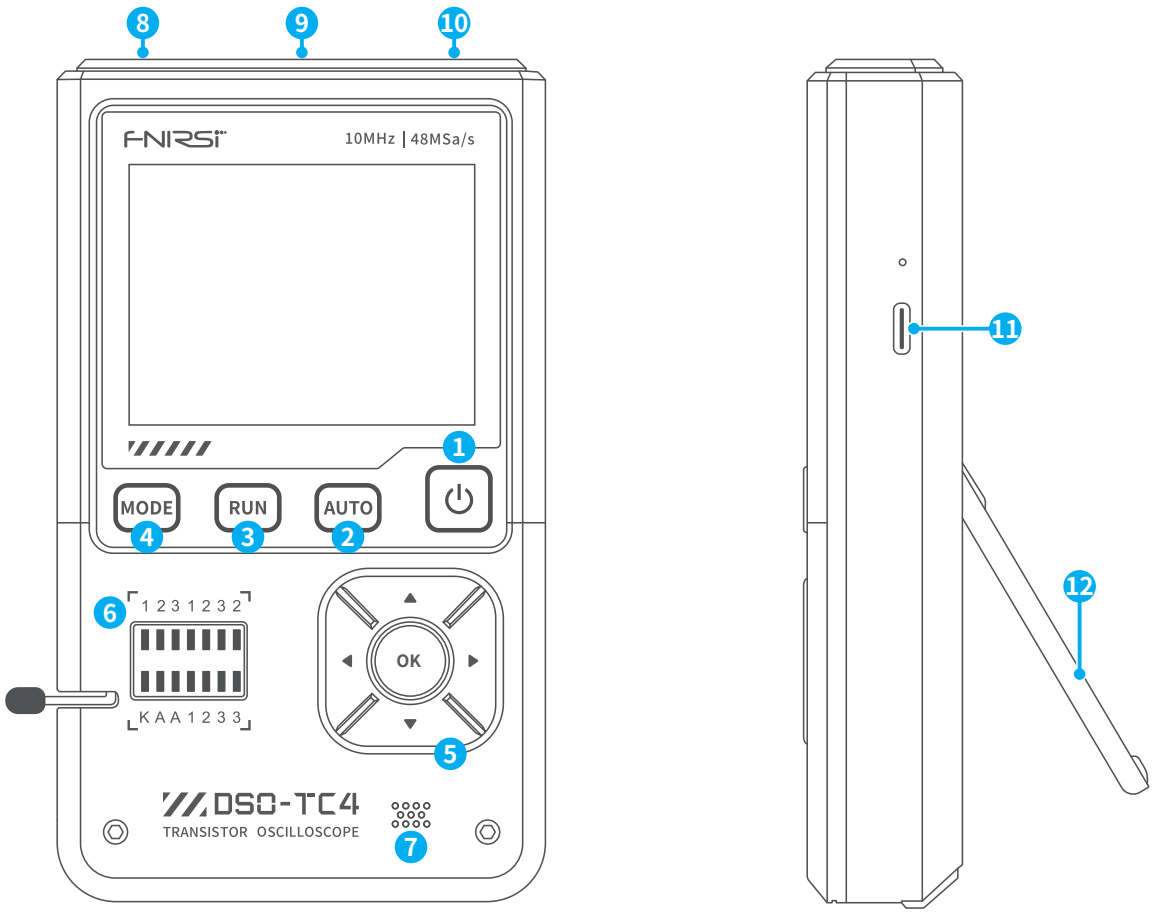
• Equipped with a 2.8-inch TFT color screen, the picture is clear and intuitive

• Built-in high-capacity rechargeable lithium battery (1500mAh), standby time 4 hours

• Small and light, suitable for mobile use.

FNIRSI-DSO-TC4 is committed to providing users with powerful, flexible functions and portable operation experience, and is an ideal tool for maintenance and R&D work.

2.2 Product Introduction



①Power switch (return button)

②Automatic measurement button

③Run/pause button

④Mode switch button

⑤button selection area

⑥Transistor socket

⑦Infrared detection port

⑧Voltage interface

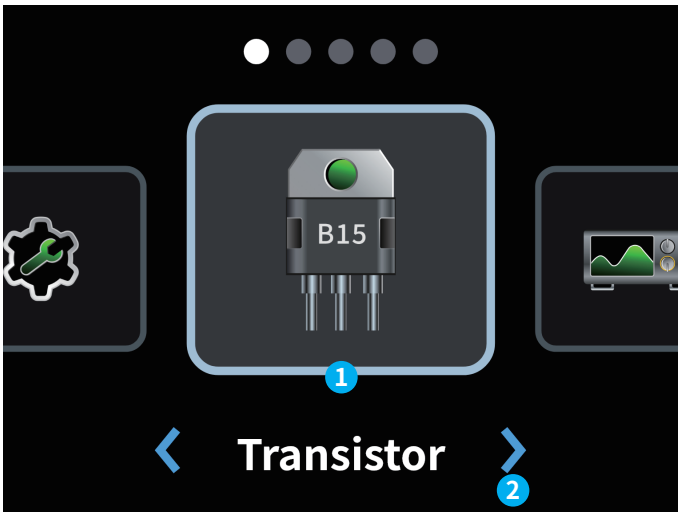
⑨Signal generator output port

⑩Oscilloscope channel interface

⑪Charging interface Type-c

⑫Support Stand

2.3 Main page

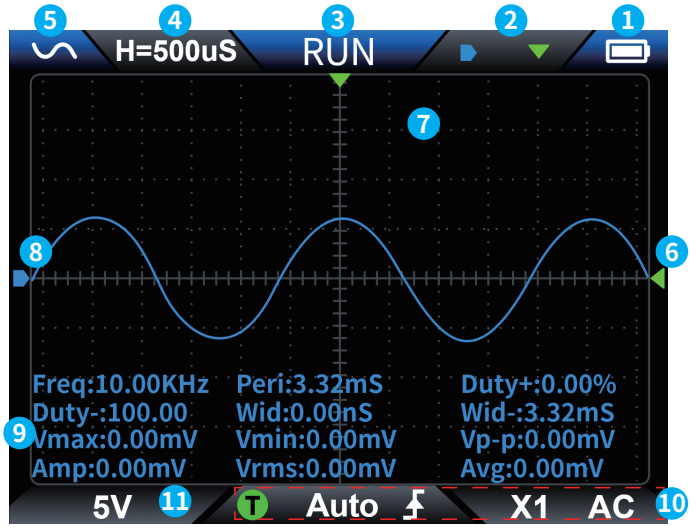


①**Function name:**This area displays the function name selected at the moment, with a total of 5 sections: transistor, oscilloscope, signal generator, toolbox, and settings.vv

②**Mode switch:**Click the left and right buttons or the up and down buttons to select the function.

button	Operation	Function
⏻	Short Press	Return to the main menu
	Long Press	Switch on/off
◀ ▶	Short Press	Switch functions in the main menu
▲ ▼	Short Press	Switch functions in the main menu
OK	Short Press	Enter the currently selected function

2.4 Oscilloscope



①**Battery display:** This area displays the remaining battery.

②**Mode switch:** Short press the **OK** confirmation button to switch horizontal and vertical units, horizontal trigger movement, channel waveform up and down movement, trigger level up and down movement.

③ **Run/pause indication:** Short press the run/pause button, RUN for running, STOP for stopping.

④**Time base:** refers to a large horizontal grid representing the length of time, which is determined by the sampling rate.

⑤**Function signal generator indication:** blue means the function signal generator is turned on, red means it is not turned on, and the displayed graph represents the set waveform category.

⑥**Trigger voltage indicator icon:** trigger threshold.

⑦**Trigger X position indicator arrow:** indicates that this is the trigger point.

⑧**Channel waveform:** waveform signal collected by the channel.

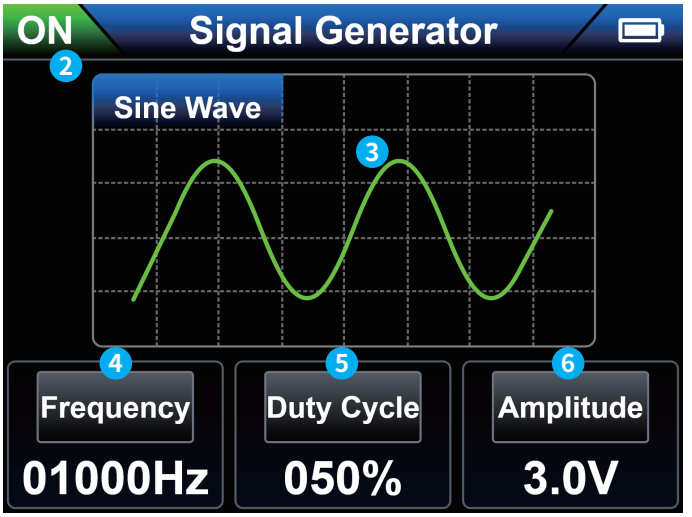
⑨**Measurement data:** You can long press the **MODE** button to turn on/off the measurement parameter display in the menu settings.

⑩**Trigger settings:** You can long press the **MODE** button to set the trigger settings and channel settings.

⑪ **Vertical sensitivity:** A large vertical grid represents the voltage length.

button	Operation	Function
⏻	Short Press	Exit button, return to the previous operation/exit mode
	Long Press	Turn off the power, Power off
MODE	Short Press	Switch to other modes
	Long Press	Open the oscilloscope setting menu, you can set the waveform, parameters, afterglow, pictures, etc. Long press again to close the menu
AUTO	Short Press	Automatic measurement
	Long Press	Automatic calibration
OK	Short Press	You can switch horizontal and vertical units, horizontal trigger movement, channel waveform movement, trigger level movement. If in the menu setting, short press to confirm the setting.
	Long Press	50%
RUN	Short Press	Click to pause, click again to run
	Long Press	Save picture

2.5 Signal generator



①**Battery display:** This area displays the remaining battery.

②**Status display:** This area displays the signal generator on-state, green (ON) is on, red (OFF) is off.

③**Waveform category:** Short press the left and right buttons to select the waveform category, a total of 13 waveforms are available.

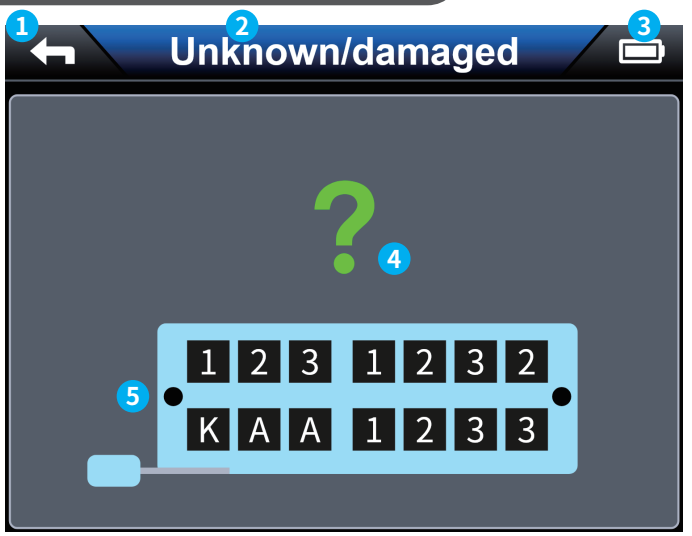
④**Frequency setting:** Click **OK** to enter the frequency/duty cycle/amplitude selection, click **OK** to select the frequency and enter the third-level navigation to set the frequency value.

⑤**Duty cycle setting:** Click **OK** to enter the frequency/duty cycle/amplitude selection, click **OK** to select the duty cycle and enter the third-level navigation to set the duty cycle.

⑥**Amplitude setting:** Click OK to enter the frequency/duty cycle/amplitude selection, click OK to select the amplitude and enter the third-level navigation to set the amplitude.

button	Operation	Function
⏻	Short Press	Exit button, return to the previous operation/exit mode
	Long Press	Turn off the power, Power off
MODE	Short Press	Switch to other modes
OK	Short Press	Confirm, enter the freguency/duty cycle/amplitude selection, adjust by ◀ / ▶ to set the corresponding value.
RUN	Short Press	Click on/off, and click on/off again

2.6 Transistor



①**Battery display:** This area displays the remaining battery.

②**Status display:** This area displays the transistor identification category/transistor status.

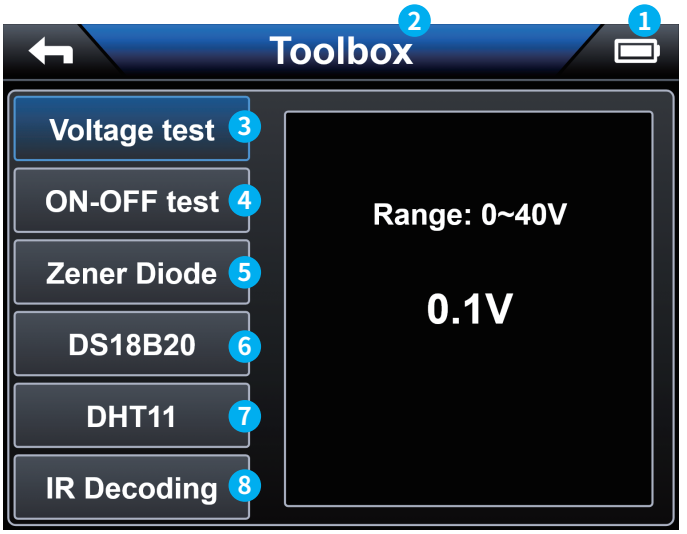
③**Return icon:** Short press the power button to exit the transistor mode.

④**Transistor indication:** This area displays the identified transistor category and displays the corresponding symbol. If it is not identified, a question mark is displayed.

⑤ **Pin indication:** This area displays the status of the transistor inserted into the identification socket, and uses different colors to distinguish, so as to facilitate the adjustment of the corresponding pin status to achieve a good identification state

button	Operation	Function
⏻	Short Press	Exit button, exit mode
	Long Press	Turn off the power, shut down
MODE	Short Press	Switch to other modes
AUTO	Short Press	Perform automatic measurement

2.7 Toolbox



①**Battery display:** This area displays the remaining battery.
②**Status display:** This area displays the mode toolbox.
③**Voltage test:** Insert the voltage measurement interface to measure its voltage, the measurement voltage range is 0-40V.
④**On-off test:** Test the on-off status of the transistor circuit/.OLΩ.
⑤**Zener diode test:** Directly insert the two pins of the Zener diode into different pins of the transistor socket for automatic measurement.
⑥**DS18B20:** Single-wire digital temperature sensor measurement.
⑦**DHT11:** Digital temperature and humidity sensor measurement, pay attention to insert pins 124 into different holes.
④**On-off test:** Test the on-off status of the transistor circuit/.OLΩ.
⑧**Infrared decoding:** Automatically parse the NEC protocol infrared code, aim at the infrared receiver to send the infrared signal, the machine will automatically decode, and after decoding, the address code, user code and waveform will be displayed.
⑨**Automatic calibration:** Click the OK confirmation button to automatically calibrate and adjust.

button	Operation	Function
⏻	Short Press	Exit button, exit mode
	Long Press	Turn off the power, shut down
MODE	Short Press	Switch to other modes
OK	Short Press	Confirm functionality, confirm execution

2.8 System settings

① Battery display: This area displays the remaining battery.

② Status display: This area displays the mode system settings.

③ Language settings: There are 8 languages to switch between: Chinese, English, Deutsch, Português, にほんご, Español, 한국인, and Русский.

④ Volume settings: Click OK to enter the volume settings, use the left and right buttons to adjust the volume, and can be set to mute.

⑤ Screen brightness: Click OK to enter the brightness settings, use the left and right buttons to adjust the brightness.

⑥ Power on: There are 3 function modes to choose to enter by default when the power is turned on, or you can choose none of them.

⑦ Automatic shutdown settings: You can set the automatic shutdown time to 15min, 30min, 1hour, and standby when there is no operation. Set the time and automatically shut down.

⑧USB sharing: After turning it on, you will enter the USB sharing interface. After connecting to the computer, a USB flash drive will pop up, and you can get the screenshot image in the [Screenshot file] folder. You can also put "LOGODSO-TC4.jpg" (custom startup LOGO) in the [LOGO] folder.

⑨About: Display brand information and current version number. Click OK to choose whether to restore factory settings.

3.TECHNICAL SPECIFICATIONS

3.1 Main Parameters

Parameter	Specification
Model	DSO-TC4
Screen	2.8-inch TFT Color Screen
Backlight	Brightness Adjustable
Power Supply	TYPE-C (5V/1A)
Battery	3.7V/1500mAh
Languages	中文、English、Deutsch、Português、 にほんご、Español、한국인、Русский
Size	≈90x142x27.5mm
Product Weight	≈186g

3.2 Oscilloscope

Parameter	Specification	Remark
Real-Time Sampling Rate	48MSa/s	
Analog Bandwidth	10MHz	
Input Impedance	1MΩ	
Coupling Mode	AC/DC	
Test Voltage Range	1:1 Probe: 80Vpp (+40V) 10:1 Probe: 800Vpp (+400V)	Oscilloscope in X1 Oscilloscope in X10
Vertical Sensitivity	10mV/div~10V/div (X1 range)	
Vertical Displacement	Adjustable with indication	
Time Base Range	50ns~20s	
Trigger Mode	Auto/Normal/Single	
Trigger Type	Rising edge, Falling edge	
Trigger Level	Adjustable with indication	
Waveform Freeze	Yes (HOLD function)	
Automatic Measurement	Max, Min, Avg, RMS, Vpp, Frequency, Cycle, Duty Cycle	

3.3 Component Testing

Category	Range	Description
Transistor	*	Amplification factor “hfe”; Base-Emitter voltage“ Ube”, Ic/Ie, Collector-Emitter reverse leakage current “Iceo”, Ices, Forward voltage drop of protection diode“ Uf"
Diode	Forward voltage drop <5V	Forward voltage drop, Junction capacitance, Reverse leakage current
Zener Diode	0.01~32V	Reverse Breakdown Voltage (K-A-A Test Area)
Field-Effect Transistor (FET)	JFET	Gate capacitance “Cg”, Drain current Id under“ Vgs”, Forward voltage drop of protection diode “Uf”
	IGBT	Drain current Id under Vgs, Forward voltage drop of protection diode Uf
	MIOSTET	Threshold voltage “Vt”, Gate capacitance “ Cg”, Drain-Source resistance “Rds”, Forward voltage drop of protection diode “Uf”
Unidirectional SCR	Trigger voltage <5V, Gate level	Gate voltage
Bidirectional SCR	Trigger current <6mA	
Capacitor	25pF~100mF	Capacitance value, Loss factor “Vloss”
Resistor	0.01Ω~50MΩ	Resistance value
Inductor	10μH~1000μH	Inductance value, DC resistance
DS18B20	-	Temperature sensor, Pins: GND, DQ, VDD
DHT11	-	Temperature and humidity sensor, Pins: VDD, DATA, GND

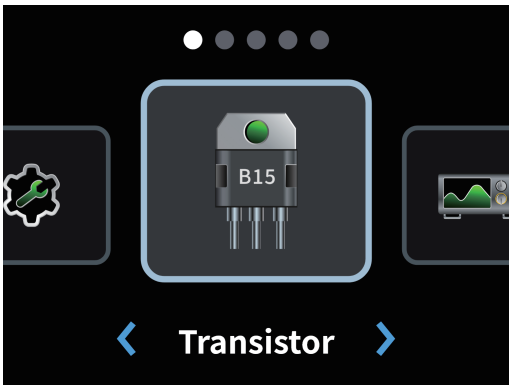
3.4 Signal Generator

Parameter	Specification
Output Waveform	Supports 13 waveform outputs
Waveform Frequency	0-50KHz
Square Wave Duty Cycle	0-100%
Waveform Amplitude	0.1V-3.0V

4.OPERATION GUIDE

4.1 Power on

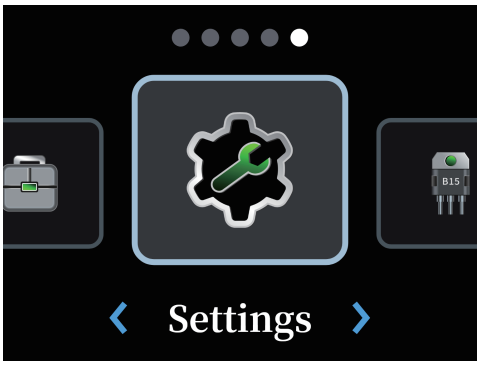
Long press ⏻ power on, wait for the system to load, and enter the default interface of system settings.



Default Interface

4.2 Language settings

In the default interface, short press ◀ / ▶ to select system settings, short press the OK button to enter system settings, select language settings by pressing ▲▼, and then short press the **OK** button to enter language settings, select the language to be set using the up/down buttons, and confirm the selection with the **OK** button.



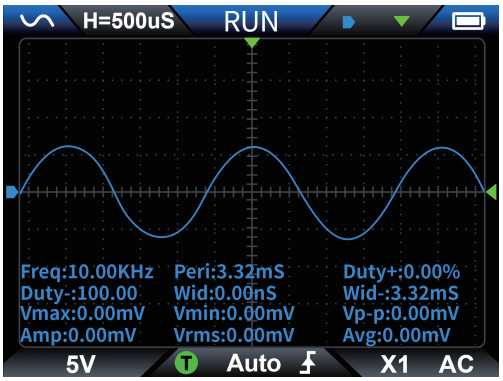
Short Press OK ⏻

4.3 Adjust oscilloscope parameters

Oscilloscope adjustment

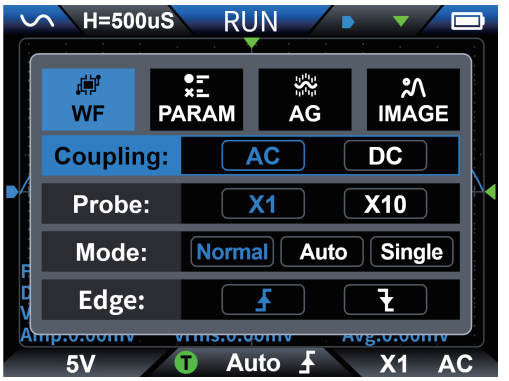
•In the default interface, short press the left and right buttons to select the function module oscilloscope, and click the **OK** confirmation button to enter the oscilloscope. Long press the mode switch button **(MODE)** to enter the oscilloscope parameter setting. You can select and set parameters such as waveform, parameters, persistence, and pictures through the button selection area. Long press the mode switch button **(MODE)** again to close the oscilloscope parameter setting.

•In the oscilloscope parameter setting, picture deletion and selection require entering the picture parameter setting interface. At this time, click the switch button **(MODE)** to select the picture, click the run/pause button **(RUN)** to select all pictures, click the automatic measurement button **(AUTO)** to select whether to delete the picture, use the up and down buttons to select the picture, click the **OK** button to confirm the check of the currently selected picture, and click again to uncheck it. Without selecting a picture, click **OK** to view the complete picture directly.



Oscilloscope Function Interface

Long Press MODE



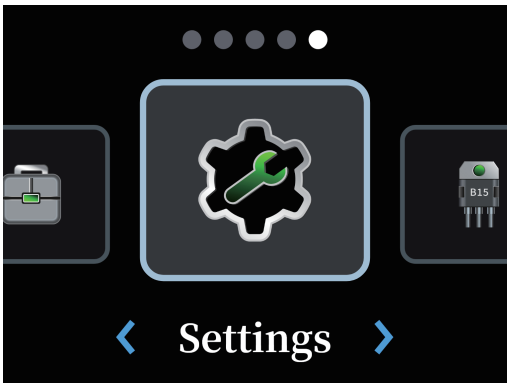
Oscilloscope Parameter Settings Interface

4.4 Brightness adjustment

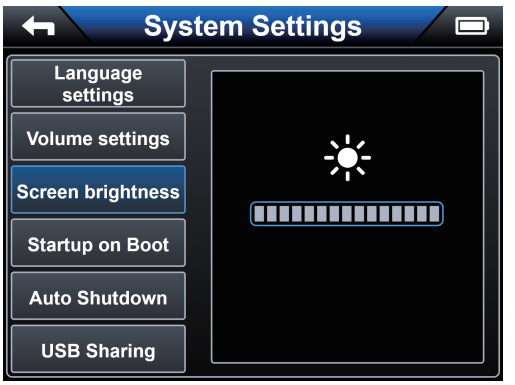
In the default interface, short press ◀ / ▶ to select system settings, short press the **OK** button to enter system settings, select screen brightness using ▲▼, and then short press the **OK** button to enter brightness settings. Use the ◀ / ▶ to adjust the brightness in real time, and click ⏻ to save.

Adjust other functions of system settings

The corresponding function selection and activation are roughly the same as the above operation navigation, and the step description is omitted.



Short Press OK ⏻



5.QUICK START

5.1 Quick Measurement

1. Turn on the multi-function transistor oscilloscope, wait for the system to load, and select the mode: oscilloscope, signal generator, transistor, etc. For example: select signal generator.
2. First connect the interface, enter the signal generator, and select the waveform to be output. Click the confirmation button to confirm the setting of frequency, duty cycle, amplitude, etc.
3. When the corresponding parameters are set, click the run/pause button to start the signal generator.
4. Click the mode switch button to perform other functions.

5.2 Firmware Upgrade

- Turn off the device, long press the MODE button and the power button at the same time, the device will pop up the Firmware Upgrade interface, insert the USB Type-c data cable to connect the computer, enter the Firmware Upgrade interface to upgrade the firmware.
- Copy the firmware file to the Upgrade file folder, then press the RUN button to upgrade.
- After pulling the firmware file to the specified folder of the U disk, press the RUN button to upgrade. If the firmware upgrade is completed, the shutdown charging interface will be displayed.

※**Note:** Firmware upgrade is only supported on computers with Windows 10 and above.

6.TROUBLESHOOTING

6.1 Unable to boot

Possible causes:

· Battery exhausted. · Loose or damaged battery connection

Solution:

①Check battery charge and charge if low

②If battery fails to charge or device still does not power on, try reinstalling or replacing the battery.

③If the device still does not power on, please Contact Technical Support.

6.2 Screen does not display

Possible causes:

· Display hardware malfunction. · System software abnormality

Solution:

①Check and adjust the backlight brightness settings according to the manual.

②Try restarting the device to ensure the system returns to normal.

③If the screen still does not display properly, the display may need to be repaired or replaced.

7. MAINTENANCE

Cleaning the outside of the device

●**Frequency:** Clean once a month, depending on the usage environment.

●**Method:** Use a soft cloth to gently wipe the surface of the device. Avoid using chemical cleaners, especially those containing alcohol or strong acids or alkalis, to avoid damaging the casing or screen.

●**Note:**

- Clean the dust around the machine and buttons regularly to keep the device well ventilated and cooled.
- Ensure that no liquid, dust or debris enters the device interface.

Check the battery and power

●**Battery maintenance:** For instruments with built-in batteries, check the health of the battery regularly. Avoid complete battery discharge. It is recommended to charge regularly and avoid not using the device for a long time.

●**Charging specifications:** Use the official charger to charge, avoid overcharging or over-discharging, and ensure that the battery is in the appropriate operating voltage range.

●**Battery replacement:** If the battery shows excessive attenuation (such as failure to charge normally or extremely fast discharge), it should be replaced in time.

Storage and Carrying:

●**Storage environment:** The device should be stored in a dry and ventilated environment, avoiding high temperature, high humidity or drastic temperature changes. Avoid placing it in direct sunlight.

●**Carrying:** Be careful to avoid falling when using, especially when carrying. It is recommended to use a protective case or a special bag for carrying.

Software Update

●Regularly check whether the device has new firmware to update. The latest firmware can fix known bugs and improve device performance.

●When updating, make sure the operation steps are correct, use the officially released firmware files, and avoid power outages or other interference.

Restore factory settings

●If the device is abnormal or does not work properly, try to restore the factory settings. After restoring the settings, the device will clear all custom configurations and return to the initial state.

●For methods to restore factory settings, please refer to the user manual or contact the manufacturer's customer service

8.CONTACT US

Any FNIRSI users who contact us with questions will receive our promise of a satisfactory solution, plus an extra 6-month warranty as a token of our appreciation for your support! By the way, we have created an exciting community, and we welcome you to contact FNIRSI staff to join.

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http://www.fnirsi.com/

9.WARRANTY INFORMATION

※**This page is the basic warranty card. Please keep it.**

Thank you for choosing our company's products. The warranty period of this product starts from the date of sale. During the product warranty period, if the product is installed and used in accordance with the product manual and used in normal environment and conditions, and the fault is caused by defects in the original materials and processing, you can enjoy free repair services according to the content of this warranty clause. Please keep this warranty card properly as a warranty certificate. No reissue will be issued if it is lost.

The following situations will incur paid repair services

1.Unable to present the original valid warranty card.

2.Damage caused by improper installation not meeting product requirements, standards, or relevant specifications.

3.Damage caused by accessories in the installation environment not meeting product requirements, standards, or relevant specifications.

4.Damage caused by improper use, improper storage, unauthorized disassembly, or unauthorized repairs by the user.

5.Expiration of the warranty period.

Warranty Card

Product Model	**DSO-TC4**	**Qty.**	
Distributor Name (where to buy)			
Contact			
Address			
Invoice Number (Order Number)			
Purchase Date (as per invoice)	**Year**	**Month**	**Day**
User Name:	**Address:**		
Contact:	**Fault Description:**		